decreased, and generally with marked changes, the greatest minus departures being reported from the northern districts to the eastward of Montana.

TEMPERATURE OF THE AIR.

The mean temperature was below the normal from southwestern Pennsylvania, Lake Erie, southern Michigan, and Indiana, southward over the South Atlantic States to the Atlantic Ocean, and over the Ohio Valley and Tennessee, and east Gulf States to the Gulf of Mexico; also along the eastern and central coasts of the west Gulf States, in the northern part of the great valley of California, and on the coast of central California; elsewhere it was above normal, with very decided departures in the Missouri Valley, North Dakota, and northern slope, the departures in Montana showing a mean daily excess of 11.9° at Helena and 13.4° at Miles City. The data compiled at Climate and Crop centers from regular Weather Bureau and cooperating stations combined show a slightly greater area of deficient temperature, and the location somewhat modified; also that the amount of excess was not so great for the various States taken as a whole as when the individual stations within the State were considered. Several Montana stations report the highest January mean temperature since the establishment of the stations.

The isotherms of maximum temperature were located somewhat to the northward of their positions in January, 1902, particularly that of 80° over Florida and the west Gulf States. The area embraced within the isotherm of zero temperature, or lower, is not so extensive as it was in January, 1902. Freezing temperatures were not reported from a narrow strip along the littoral of Texas, and in parts of extreme southern and east-central and west-central Florida.

The average temperature for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	8	25.9	+0.9		
Middle Atlantic	12	32.8	+0.3		
South Atlantic	10	46.5	−1.1		
Florida Peninsula*	8	59.9	+0.1		
East Gulf	9	47.5	−1.3		
West Gulf	7	48.1	+1.5		
Ohio Valley and Tennessee	11	33.9	−0.3		
Lower Lake	8	25.3	0.0		
Upper Lake	10	19.5	+2.0		
North Dakota*	8	11.4	+6.1		
Upper Mississippi Valley	11	24.8	+3.7		
Missouri Valley	11	25.7	+5.7		
Northern Slope	7	26.4	+8.9		
Middle Slope	6	34.4	+5.3		
Southern Slope*	6	40.9	+2.4		
Southern Plateau*	13	38.5	+2.7		
Middle Plateau*	9	26.4	+1.5		
Northern Plateau*	12	31.0	+5.8		
North Pacific	7	42.6	+3.2		
Middle Pacific	5	46.8	−0.2		
South Pacific	4	53.1	+2.5		

*Regular Weather Bureau and selected voluntary stations.

In Canada.—Prof. R. F. Stupart says:

The mean temperature of the month was higher than the average over very nearly the entire Dominion, the only districts where a negative departure was registered being the extreme southwest counties of Ontario, and in far northern regions near Hudson's Bay, and in Athabasca, Yukon, and Cassair. The largest positive departures, between 9° and 12°, occurred in Assiniboia; westward from this territory the departure diminished to 3° at Vancouver, and eastward to 3° at Lake Superior, whence across Ontario, Quebec, and the Maritime Provinces it ranged from average to 2° above, except near Lake Erie and in the upper Ottawa Valley where it was about 1° below.

PRECIPITATION.

Data tabulated from reports from regular Weather Bureau stations show the precipitation to have been below the normal, except in parts of the lower Lake region, New England, the Middle Atlantic, South Atlantic, Gulf States, North Dakota, and in the upper Rio Grande Valley, and from northern Utah and southwestern Idaho westward to the Pacific. The greatest excess occurred on the northwestern coast of California. Deficiencies ranging from 1 inch to 4 inches obtained in the eastern part of the west Gulf States, northern part of the east Gulf States, the Ohio Valley and Tennessee, the upper Lake region, and central Mississippi Valley. The greatest monthly amounts of precipitation occurred in the Pacific districts north of central California. Relatively large amounts are also reported from the Florida Peninsula.

The southern limit of snow on ground at the end of the month was located much farther to the northward than at the end of January, 1902, except over the Plateau and western parts of the slope regions where it was about the same, and on the Pacific coast where it extended to the southern border of Oregon.

The snow conditions in the western mountains are generally very satisfactory, and a good and ample flow of water for irrigation purposes seems to be assured for the coming crop season. During the latter part of the month the snowfall in Nevada was the heaviest since 1890, as it also was over the great Salt Lake watershed in Utah. The snowfall was deficient in the Upper Peninsula of Michigan.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	8	3.65	92	−0.3	
Middle Atlantic	12	3.38	92	−0.2	
South Atlantic	10	3.80	90	−0.4	
Florida Peninsula*	8	5.58	194	+2.7	
East Gulf	9	4.28	81	−1.0	
West Gulf	7	2.59	74	−0.9	
Ohio Valley and Tennessee	11	2.28	55	−1.9	
Lower Lake	8	2.25	85	−0.4	
Upper Lake	10	1.19	60	−0.8	
North Dakota*	8	0.78	134	+0.2	
Upper Mississippi Valley	11	0.92	51	−0.9	
Missouri Valley	11	0.48	49	−0.5	
Northern Slope	7	0.31	51	−0.3	
Middle Slope	6	0.18	23	−0.6	
Southern Slope*	6	0.44	47	−0.5	
Southern Plateau*	13	0.35	30	−0.8	
Middle Plateau*	8	1.30	108	+0.1	
Northern Plateau*	12	1.76	81	−0.4	
North Pacific	7	8.34	94	−0.5	
Middle Pacific	5	5.65	106	+0.3	
South Pacific	4	2.08	78	−0.6	

*Regular Weather Bureau and selected voluntary stations.

In Canada.—Professor Stupart says:

The precipitation did not differ much from average anywhere except perhaps very locally, and this more especially in Ontario where there were instances of positive and negative departures at stations not far distant from each other. In the eastern and northern portions of the Northwest Territories the snowfall was rather in excess of the average, but west and south it was deficient. At the close of the month snow lay to a depth of from three to five feet over the more eastern portions of Quebec, but southward over the Maritime Provinces the depth diminished to a light covering near the Bay of Fundy, and to none in western Nova Scotia; westward the depth diminished from 34 inches at Quebec to 15 at Montreal, and then to almost nil at Kingston and near the shores of Ontario and Erie, with a moderate covering over the inland counties of Ontario. In Saskatchewan and northern Alberta the depth was between 12 and 18 inches, and less farther south.

HAIL.

The following are the dates on which hail fell in the respective States:

Arizona, 16, 17. Arkansas, 27. California, 26, 27, 28, 30, 31. Florida, 17, 26, 28. Idaho, 25. Indian Territory, 7, 26. Kentucky, 10, 29. Maryland, 11, 20, 24. Massachusetts, 2, 3, 11, 30. New York, 11, 28, 30. North Carolina, 6, 10, 11, 20, 21, 24.

Ohio, 11. Oregon, 8, 18, 19, 24, 25, 26, 27, 28, 29, 30, 31. Pennsylvania, 2, 3, 11, 20, 29. Rhode Island, 7, 11, 30. South Carolina, 7. Texas, 20. Utah, 10, 18, 22, 25, 28. Virginia, 4, 11, 20, 24. Washington, 8, 18, 19, 24, 25. West Virginia, 11. Wyoming, 28.

SLEET.

The following are the dates on which sleet fell in the respective States:

Alabama, 10, 13, 14. Arizona, 17. Arkansas, 10, 11, 19, 20, 24. California, 15, 26, 27, 28, 29, 30, 31. Colorado, 4, 28. Connecticut, 2, 11, 21. Delaware, 4. District of Columbia, 11. Georgia, 6, 10, 12, 14, 20, 22. Idaho, 1, 3, 17, 21, 22, 23. Illinois, 2, 10, 11, 20, 23, 24, 27. Indiana, 2, 3, 4, 6, 7, 10, 11, 21, 23, 31. Indian Territory, 10, 31. Iowa, 2, 3, 25, 26, 27, 28. Kansas, 10, 16, 20, 22, 23, 28. Kentucky, 3, 7, 10, 11, 12, 20. Louisiana, 13, 14. Maine, 3, 21, 30. Maryland, 2, 4, 7, 11, 20, 21, 30. Massachusetts, 2, 3, 11, 21. Michigan, 2, 3, 4, 15, 26, 29. Minnesota, 6, 26, 27, 28. Mississippi, 10, 13, 14, 27. Missouri, 1, 2, 4, 10, 11, 21, 22, 23, 24, 29, 31. Montana, 18, 20, 21, 25. Nebraska, 25, 27, 28. Nevada, 21, 23, 25, 27. New Hampshire, 3, 11, 21, 29. New Jersey, 3, 11, 21, 27, 29, 30. New Mexico, 16. New York, 2, 3, 11, 15, 20, 21, 28, 29, 31. North Carolina, 10, 11, 19, 20, 21, 24, 27. North Dakota, 3, 6, 13, 21, 25. Ohio, 2, 6, 7, 11, 21, 31. Oklahoma, 9, 10, 19, 20, 23. Oregon, 26, 27, 28, 30, 31. Pennsylvania, 2, 3, 5, 11, 12, 15, 17, 20, 21, 30. Rhode Island, 11, 30. South Carolina, 6, 10, 11, 14, 19, 20, 21, 22. South Dakota, 3, 26, 27, 28. Tennessee, 4, 5, 8, 10, 11, 16, 17, 19, 20. Texas, 13, 15, 20. Utah, 1, 11, 21, 22, 24, 25, 26, 27, 28, 30, 31. Vermont, 3, 21. Virginia, 4, 7, 10, 11, 12, 20, 21, 24. Washington, 8, 12, 18, 20, 24, 25, 26, 27, 28, 29, 31. West Virginia, 1, 2, 10, 11, 12, 20, 21, 22, 23, 25. Wisconsin, 26, 27, 28, 29. Wyoming, 22, 25, 26.

HUMIDITY.

The averages by districts appear in the subjoined table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	74	— 2	Missouri Valley	79	+ 1
Middle Atlantic	75	0	Northern Slope	74	+ 4
South Atlantic	78	0	Middle Slope	68	+ 1
Florida Peninsula	84	+ 2	Southern Slope	66	+ 2
East Gulf	77	— 1	Southern Plateau	47	— 4
West Gulf	75	0	Middle Plateau	71	+ 2
Ohio Valley and Tennessee	77	0	Northern Plateau	84	+ 3
Lower Lake	82	+ 1	North Pacific	87	0
Upper Lake	82	0	Middle Pacific	86	+ 5
North Dakota	78	— 3	South Pacific	71	— 3
Upper Mississippi Valley	80	+ 2			

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IV, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 372 thunderstorms were received during the current month as against 104 in 1902 and 386 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country was most numerous were: 29th, 76; 27th, 54; 26th, 52.

Reports were most numerous from: Florida, 54; New York, 46; Louisiana, 39.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz: 9th to 17th.

In Canada: Thunderstorms were reported from Ottawa, 17; Toronto, 29; Port Stanley, 29. An aurora was observed at Battleford on the 5th.

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

The averages for the various districts, with departures from the normal, are shown in the table below:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.5	— 0.3	Missouri Valley	5.0	— 0.1
Middle Atlantic	6.1	+ 0.5	Northern Slope	4.8	+ 0.2
South Atlantic	6.0	+ 0.7	Middle Slope	4.6	+ 0.8
Florida Peninsula	6.4	+ 1.7	Southern Slope	4.4	+ 0.6
East Gulf	6.2	+ 0.6	Southern Plateau	3.4	+ 0.5
West Gulf	5.2	+ 0.8	Middle Plateau	4.6	— 0.2
Ohio Valley and Tennessee	6.6	+ 0.2	Northern Plateau	7.8	+ 0.5
Lower Lake	7.8	+ 0.3	North Pacific	8.2	+ 1.1
Upper Lake	7.0	+ 0.2	Middle Pacific	6.4	+ 1.3
North Dakota	5.3	+ 0.6	South Pacific	4.6	+ 0.5
Upper Mississippi Valley	5.8	+ 0.5			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Bismarck, N. Dak	6	63	nw.	North Head, Wash	1	60	s.
Block Island, R. I	12	55	w.	Do	2	58	s.
Do	18	50	nw.	Do	18	68	se.
Do	30	52	w.	Do	20	52	se.
Do	31	56	w.	Do	23	50	se.
Buffalo, N. Y	12	56	w.	Do	24	51	nw.
Do	15	53	w.	Do	29	84	se.
Do	30	64	w.	Omaha, Nebr	7	52	nw.
Carson City, Nev	24	56	sw.	Point Reyes Light, Cal	24	50	sw.
Do	25	60	sw.	Do	25	59	nw.
Do	26	63	sw.	Do	26	54	s.
Do	27	50	sw.	Do	27	72	s.
Cheyenne, Wyo	6	55	nw.	Do	30	58	s.
Cleveland, Ohio	7	54	nw.	Do	31	50	nw.
Do	30	54	w.	St. Louis, Mo	7	52	w.
Columbus, Ohio	29	50	w.	Sioux City, Iowa	6	72	nw.
Do	30	60	w.	Do	7	65	nw.
Duluth, Minn	7	51	nw.	Syracuse, N. Y	11	64	s.
Fort Smith, Ark	7	50	nw.	Do	30	50	sw.
Hannibal, Mo	7	52	nw.	Tatoosh Island, Wash	6	71	e.
Harrisburg, Pa	30	53	w.	Do	7	72	e.
Hatteras, N. C	8	60	w.	Do	10	52	e.
Huron, S. D	6	72	nw.	Do	13	50	ne.
Do	7	52	nw.	Do	18	50	s.
Independence, Cal	25	75	w.	Do	19	50	sw.
Jacksonville, Fla	7	57	sw.	Do	20	62	s.
Lincoln, Nebr	6	60	nw.	Do	23	64	sw.
Do	7	58	nw.	Do	24	64	w.
Mount Tamalpais, Cal	18	51	nw.	Do	25	50	nw.
Do	24	57	sw.	Do	29	52	sw.
Do	25	86	nw.	Valentine, Nebr	6	57	nw.
Do	26	57	s.	Do	7	60	nw.
Do	27	51	sw.	Williston, N. Dak	6	66	nw.
New York, N. Y	3	56	w.	Do	19	50	nw.
Do	12	62	w.	Winnemucca, Nev	26	61	sw.
Do	30	60	w.	Yankton, S. Dak	6	50	nw.
Do	31	52	w.	Do	7	50	nw.

DESCRIPTION OF TABLES AND CHARTS.

By W. B. STOCKMAN, Forecast Official, in charge of Divison of Meteorological Records.

For description of tables and charts see page 582 of REVIEW for December, 1902.